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1180 species of vertebrates, systematically arranged, with the vernacular names of each species. The identification is made from standard authorities and is generally correct, reflecting much credit on the patience and conscientiousness of its author, Mr. Namiye.

R. Lauterborn (*Zool. Anzeiger*, Bd. XXIV (1901), pp. 50–55) has found that shallow fresh-water ponds covered with such floating plants as duckweed, and with bottoms of black vegetable ooze often generating hydrogen sulphide, contain a very uniform and characteristic life. The flora is mostly sulphur bacteria, the almost complete absence of desmids and diatoms being very striking. The fauna contains, in addition to certain rhizopods and flagellates, no less than eighteen exclusively characteristic species of Infusoria. The author proposes to call this well-defined fauna and flora sapropelic, because of its association with decaying mud.

BOTANY.

A New Work on Gymnosperms.[1] — This is a very welcome addition to the list of books dealing with the special morphology of the higher plants.

The last five years have been notable for the number of important contributions to our knowledge of the Gymnosperms, and these recent discoveries have very materially changed the older views as to the affinities of some of them, notably the Ginkgoales. The book before us summarizes, very successfully, the results of these investigations, and should be very much appreciated by all botanical students.

While the book is largely a compilation, it includes some original work, especially in the illustrations, many of which are exceptionally good.

The book deals principally with the reproductive parts, which are treated very much in detail. While the writer agrees with the authors that an elaborate discussion of the vegetative organs was impracticable in a book of this character, still the value of the book would have been much enhanced by a proper treatment of the more important anatomical characters of the vegetative organs of the principal groups. This is especially the case in regard to the apical meristems. A single borrowed figure (Fig. 48) is hardly sufficient to make clear the characters of the apical meristems of the whole group.

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[1] Coulter, J. M., and Chamberlain, C. J. *Morphology of Spermatophytes*. New York, Appleton, 1901. 8vo, x + 188 pp., 106 figs.

Four coördinate series of living Gymnosperms are recognized, *viz.* : Cycadales, Ginkgoales, Coniferales, Gnetales. These are considered successively, the details of the gametophyte and embryo being treated very completely. On the whole, the treatment of the Cycads and Ginkgoales is most satisfactory, although including less original matter than the chapter on the Conifers. The important work of Webber, Lang, Ikeno, and Hirase are given full attention, and the chapters are fully illustrated by numerous well selected and well executed figures.

The chapter on the Conifers is to a great extent a study of *Pinus laricio*, presumably the work of the junior author. This is very complete and admirably executed. It is to be regretted, however, that the author did not include some of the numerous important American types as well as the highly specialized genus Pinus. The work hitherto done upon the genera Taxodium, Sequoia, Torreya, Thuja, etc., is very incomplete, and the inclusion of these in the book would have been a real contribution to the literature of the subject. As it is, the chapter on the Conifers must be considered much less satisfactory than those upon the other orders.

The later chapters treat very satisfactorily the fossil Gymnosperms, comparative morphology of Gymnosperms, phylogeny and geographical distribution. A valuable feature in the chapter upon the fossil forms is a series of photographs illustrating some of the Mesozoic Cycads of the United States.

The conclusions as to the origin and affinities of the Gymnosperms are essentially the same as those given by Professor D. H. Scott in his recent work on fossil plants, *i.e.*, all of the existing Gymnosperms are referable to a common ancestral stock, of filicineous origin. This conclusion, we surmise, will not be admitted, without reservation, by all botanists.

The illustrations are, for the most part, extremely good. Some of the half-tone figures, however, such as the sections of leaves shown in Figs. 5 and 47, are too blurred to have much value, and might well be replaced by good line drawings.

An admirable feature of the book is the carefully prepared bibliographies at the end of the chapters.

The book has a distinct place, and ought to be very welcome, both as a work of reference and as a stimulus to further work in this important group of plants, which are so well represented in our own flora.

D. H. C.

MacDougal's Plant Physiology.[1] — Those who have had occasion to feel the lack of a clear, concise, and up-to-date text in plant physiology will welcome the appearance of any promising book on this subject. Dr. D. T. MacDougal, of the New York Botanical Garden, is the author of a work of this character.

Dr. MacDougal points out in his preface the increased recognition of irritability in its various manifestations, due chiefly to the work of Pfeffer, and makes this the cardinal point in his arrangement of the subject-matter. The first seven chapters are devoted to a consideration of this subject in its different phases. The study of these functions and properties, or the organism and its interaction with environmental conditions, is thus the first task of the student. The composition of the plant body, exchange and movements of liquids, metabolism, growth and reproduction, are taken up in the order named. To some this order of consideration may seem open to question on the ground that the student is plunged immediately into the thick of the most obscure of plant activities, where he can find little by way of physical or chemical foundation to lend him support.

In general, the treatment of the different phases of the subject of irritability is very satisfactory. One notes with pleasure that recent work has been incorporated. A sense of being in touch with the movement of the science is worth not a little as a stimulus to the student. This prompt acceptance, however, in an elementary text, of work that has not been thoroughly verified, unfortunately has its possible disadvantages. Occasionally, without criticising a given piece of work, one hesitates to accept the author's statement of results without a grain of salt. Explanations, even though plausible, may rightly fail to win unreserved adherence until more evidence is at hand. The work of Nemec on transmission of stimuli, Loew's explanation of the action of various classes of poisons, and (in another part of the book) Nathansohn's amitotic nuclear division under the circumstances reported, illustrate the principle just enunciated. In some cases, through oversight, minor errors have crept

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[1] MacDougal, D. T. *Practical Text-Book of Plant Physiology.* London, Longmans, Green & Co., 1891. 8vo, 352 pp., 159 figs.